

$a_4(2040)$ $I^G(J^{PC}) = 1^-(4^{++})$

NODE=M017

 $a_4(2040)$ MASS

| VALUE (MeV) | EVTS | DOCUMENT ID | TECN | CHG | COMMENT |
|--|-------------|-------------|---------|-----|--|
| 1996^{+10}_{-9} OUR AVERAGE | | | | | Error includes scale factor of 1.1. |
| 1885 \pm 13 $^{+50}_{-2}$ | 420k | ALEKSEEV | 10 COMP | | $190 \pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$ |
| 1985 \pm 10 \pm 13 | 145k | LU | 05 B852 | | $18 \pi^- p \rightarrow \omega \pi^- \pi^0 p$ |
| 1996 \pm 25 \pm 43 | | CHUNG | 02 B852 | | $18.3 \pi^- p \rightarrow 3\pi p$ |
| 2005 $^{+25}_{-45}$ | 1 ANISOVICH | 01F SPEC | | | $2.0 \bar{p}p \rightarrow 3\pi^0, \pi^0 \eta, \pi^0 \eta'$ |
| 2000 \pm 40 $^{+60}_{-20}$ | | IVANOV | 01 B852 | | $18 \pi^- p \rightarrow \eta' \pi^- p$ |
| 1944 \pm 8 \pm 50 | 2 AMELIN | 99 VES | | | $37 \pi^- A \rightarrow \omega \pi^- \pi^0 A^*$ |
| 2010 \pm 20 | 3 DONSKOV | 96 GAM2 0 | | | $38 \pi^- p \rightarrow \eta \pi^0 n$ |
| 2040 \pm 30 | 4 CLELAND | 82B SPEC | \pm | | $50 \pi p \rightarrow K_S^0 K^\pm p$ |
| 2030 \pm 50 | 5 CORDEN | 78C OMEG 0 | | | $15 \pi^- p \rightarrow 3\pi n$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 2004 \pm 6 | 80k | 6 UMAN | 06 E835 | | $5.2 \bar{p}p \rightarrow \eta \eta \pi^0$ |
| 1903 \pm 10 | | 7 BALDI | 78 SPEC | $-$ | $10 \pi^- p \rightarrow p K_S^0 K^-$ |

- 1 From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.
 2 May be a different state.
 3 From a simultaneous fit to the G_+ and G_0 wave intensities.
 4 From an amplitude analysis.
 5 $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.
 6 Statistical error only.
 7 From a fit to the Y_8^0 moment. Limited by phase space.

NODE=M017M

NODE=M017M

 $a_4(2040)$ WIDTH

| VALUE (MeV) | EVTS | DOCUMENT ID | TECN | CHG | COMMENT |
|--|-------------|-------------|---------|-----|---|
| 255^{+28}_{-24} OUR AVERAGE | | | | | Error includes scale factor of 1.3. See the ideogram below. |
| 294 \pm 25 $^{+46}_{-19}$ | 420k | ALEKSEEV | 10 COMP | | $190 \pi^- Pb \rightarrow \pi^- \pi^- \pi^+ Pb'$ |
| 231 \pm 30 \pm 46 | 145k | LU | 05 B852 | | $18 \pi^- p \rightarrow \omega \pi^- \pi^0 p$ |
| 298 \pm 81 \pm 85 | | CHUNG | 02 B852 | | $18.3 \pi^- p \rightarrow 3\pi p$ |
| 180 \pm 30 | 8 ANISOVICH | 01F SPEC | | | $2.0 \bar{p}p \rightarrow 3\pi^0, \pi^0 \eta, \pi^0 \eta'$ |
| 350 \pm 100 $^{+70}_{-50}$ | | IVANOV | 01 B852 | | $18 \pi^- p \rightarrow \eta' \pi^- p$ |
| 324 \pm 26 \pm 75 | 9 AMELIN | 99 VES | | | $37 \pi^- A \rightarrow \omega \pi^- \pi^0 A^*$ |
| 370 \pm 80 | 10 DONSKOV | 96 GAM2 0 | | | $38 \pi^- p \rightarrow \eta \pi^0 n$ |
| 380 \pm 150 | 11 CLELAND | 82B SPEC | \pm | | $50 \pi p \rightarrow K_S^0 K^\pm p$ |
| 510 \pm 200 | 12 CORDEN | 78C OMEG 0 | | | $15 \pi^- p \rightarrow 3\pi n$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| 401 \pm 16 | 80k | 13 UMAN | 06 E835 | | $5.2 \bar{p}p \rightarrow \eta \eta \pi^0$ |
| 166 \pm 43 | | 14 BALDI | 78 SPEC | $-$ | $10 \pi^- p \rightarrow p K_S^0 K^-$ |

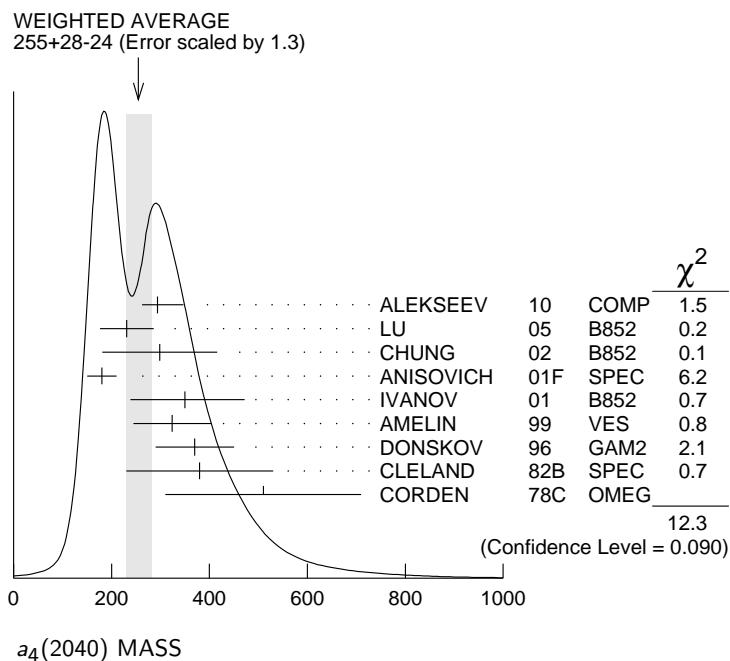
- 8 From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F.
 9 May be a different state.
 10 From a simultaneous fit to the G_+ and G_0 wave intensities.
 11 From an amplitude analysis.
 12 $J^P = 4^+$ is favored, though $J^P = 2^+$ cannot be excluded.
 13 Statistical error only.
 14 From a fit to the Y_8^0 moment. Limited by phase space.

NODE=M017M;LINKAGE=AN
NODE=M017M;LINKAGE=DM
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NODE=M017M;LINKAGE=ST
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NODE=M017W

NODE=M017W

NODE=M017W;LINKAGE=AN
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NODE=M017W;LINKAGE=A
NODE=M017W;LINKAGE=C
NODE=M017W;LINKAGE=M
NODE=M017W;LINKAGE=ST
NODE=M017W;LINKAGE=Y



a₄(2040) DECAY MODES

| Mode | Fraction (Γ_i/Γ) |
|------------------------------|--------------------------------|
| $\Gamma_1 K\bar{K}$ | seen |
| $\Gamma_2 \pi^+ \pi^- \pi^0$ | seen |
| $\Gamma_3 \rho\pi$ | seen |
| $\Gamma_4 f_2(1270)\pi$ | seen |
| $\Gamma_5 \omega\pi^-\pi^0$ | seen |
| $\Gamma_6 \omega\rho$ | seen |
| $\Gamma_7 \eta\pi^0$ | seen |
| $\Gamma_8 \eta'(958)\pi$ | seen |

a₄(2040) BRANCHING RATIOS

| $\Gamma(K\bar{K})/\Gamma_{\text{total}}$ | Γ_1/Γ |
|---|---|
| <u>VALUE</u> | <u>DOCUMENT ID</u> <u>TECN</u> <u>CHG</u> <u>COMMENT</u> |
| seen | BALDI 78 SPEC ± 10 $\pi^- p \rightarrow K_S^0 K^- p$ |
| $\Gamma(\pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$ | Γ_2/Γ |
| <u>VALUE</u> | <u>DOCUMENT ID</u> <u>TECN</u> <u>CHG</u> <u>COMMENT</u> |
| seen | CORDEN 78C OMEG 0 15 $\pi^- p \rightarrow 3\pi n$ |
| $\Gamma(\rho\pi)/\Gamma(f_2(1270)\pi)$ | Γ_3/Γ_4 |
| <u>VALUE</u> | <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> |
| 1.1±0.2±0.2 | CHUNG 02 B852 18.3 $\pi^- p \rightarrow 3\pi p$ |
| $\Gamma(\eta\pi^0)/\Gamma_{\text{total}}$ | Γ_7/Γ |
| <u>VALUE</u> | <u>DOCUMENT ID</u> <u>TECN</u> <u>CHG</u> <u>COMMENT</u> |
| seen | DONSKOV 96 GAM2 0 38 $\pi^- p \rightarrow \eta\pi^0 n$ |
| $\Gamma(\omega\rho)/\Gamma_{\text{total}}$ | Γ_6/Γ |
| <u>VALUE</u> | <u>EVTS</u> <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u> |
| seen | 145k LU 05 B852 18 $\pi^- p \rightarrow \omega\pi^-\pi^0 p$ |

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DESIG=2

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DESIG=6;OUR EST;→ UNCHECKED ←

DESIG=7;OUR EST;→ UNCHECKED ←

DESIG=8

DESIG=3

DESIG=4;OUR EST;→ UNCHECKED ←

NODE=M017220

NODE=M017R1

NODE=M017R1

NODE=M017R2

NODE=M017R2

NODE=M017R4

NODE=M017R4

NODE=M017R3

NODE=M017R3

NODE=M017R5

NODE=M017R5

a₄(2040) REFERENCES

NODE=M017

| | | | | | |
|-----------|-----|------------------------------|------------------------------|------------------------|-------------|
| ALEKSEEV | 10 | PRL 104 241803 | M.G. Alekseev <i>et al.</i> | (COMPASS Collab.) | REFID=53356 |
| UMAN | 06 | PR D73 052009 | I. Uman <i>et al.</i> | (FNAL E835) | REFID=51063 |
| LU | 05 | PRL 94 032002 | M. Lu <i>et al.</i> | (BNL E852 Collab.) | REFID=50459 |
| CHUNG | 02 | PR D65 072001 | S.U. Chung <i>et al.</i> | (BNL E852 Collab.) | REFID=48837 |
| ANISOVICH | 01F | PL B517 261 | A.V. Anisovich <i>et al.</i> | | REFID=48352 |
| IVANOV | 01 | PRC 86 3977 | E.I. Ivanov <i>et al.</i> | (BNL E852 Collab.) | REFID=48317 |
| AMELIN | 99 | PAN 62 445 | D.V. Amelin <i>et al.</i> | (VES Collab.) | REFID=46910 |
| | | Translated from YAF 62 487. | | | |
| ANISOVICH | 99C | PL B452 173 | A.V. Anisovich <i>et al.</i> | | REFID=46903 |
| ANISOVICH | 99E | PL B452 187 | A.V. Anisovich <i>et al.</i> | | REFID=46902 |
| DONSKOV | 96 | PAN 59 982 | S.V. Donskov <i>et al.</i> | (GAMS Collab.) IGJPC | REFID=45207 |
| | | Translated from YAF 59 1027. | | | |
| CLELAND | 82B | NP B208 228 | W.E. Cleland <i>et al.</i> | (DURH, GEVA, LAUS+) | REFID=21281 |
| BALDI | 78 | PL 74B 413 | R. Baldi <i>et al.</i> | (GEVA) JP | REFID=21783 |
| CORDEN | 78C | NP B136 77 | M.J. Corden <i>et al.</i> | (BIRM, RHEL, TELA+) JP | REFID=20859 |
